

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, DC 20554

In the Matter of	)	
	)	
Use of Spectrum Bands Above 24 GHz For Mobile Radio Services	)	GN Docket No. 14-177
	)	
Establishing a More Flexible Framework to Facilitate Satellite Operations in the 27.5-28.35 GHz and 37.5-40 GHz Bands	)	IB Docket No. 15-256
	)	
Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 To Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services	)	WT Docket No. 10-112
	)	
Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations	)	IB Docket No. 97-95
	)	

**COMMENTS OF NOKIA**

Nokia submits Comments in response to the Commission’s Second Further Notice of Proposed Rulemaking (“*Second FNPRM*”) in the above captioned proceedings.<sup>1</sup> Nokia strongly supports the Commission’s continued efforts to unlock the promise of high-band spectrum resources for terrestrial wireless use.

---

<sup>1</sup> *Use of Spectrum Bands Above 24 GHz for Mobile Radio Service*, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, GN Docket No. 14-177 *et al.*, FCC 17-152 (rel. Nov. 22, 2017) (“*Second R&O*, *Second FNPRM*, *et al.*”).

As an initial matter, before addressing the issues raised in the *Second FNPRM*, Nokia respectfully requests that the Commission establish auction procedures and hold an auction for the mmWave bands for which the Commission has already established service rules: the 24.25-24.45 GHz and 24.75-25.25 GHz (“24 GHz”), 27.5-28.35 GHz (“28 GHz”), 37.6-40 GHz (“37/39 GHz”), and 47.2-48.2 GHz (“47 GHz”) spectrum bands. The public interest would be served by putting these bands into actual use without further delay.

With respect to items expressly raised in the *Second FNPRM*, Nokia demonstrates that aggregate interference limits are not warranted in the 24 GHz band to protect satellite service. The Commission should adhere to recent precedent where it declined to impose such limits. Nokia also supports the Commission’s proposal to require operability throughout the 24 GHz band. We conclude our Comments by urging the Commission to continue its consideration of mobile services in additional bands above 24 GHz.

**I. THE COMMISSION SHOULD HOLD TO ITS EARLIER FINDINGS THAT AGGREGATE INTERFERENCE PROTECTIONS FOR SATELLITE SERVICE ARE NOT WARRANTED**

In the *Order* accompanying the *Second FNPRM*, the Commission adopted its proposal to authorize fixed and mobile services under the Part 30 Upper Microwave Flexible Service rules in the 24 GHz Band, consistent with service rules adopted for the 28 GHz and 39 GHz bands.<sup>2</sup> In the *Second Further Notice*, the Commission proposes to adopt proposals of SIA, SES and O3B to also allow more Fixed Satellite Service (FSS) use in the 24 GHz band, while recognizing that predominant use of the band will be for terrestrial wireless services.<sup>3</sup>

---

<sup>2</sup> *Id.* ¶ 92.

<sup>3</sup> *Id.* ¶¶ 94-95.

Nokia does not comment on that general proposal regarding FSS use here, but we are concerned that the Commission has sought comment on the question of aggregate interference to satellite receivers from terrestrial services. Based on a substantial record, the Commission has declined to set specific aggregate interference limits on terrestrial services in prior phases of this proceeding and there is no compelling reason to change course here. Specifically, in the past, the Commission found that legal and policy precedent in other bands argued against such limits. As a technical matter, the Commission further found that those asking the Commission to impose limits failed to show “that harmful aggregate interference is likely to occur from the mobile operations now being authorized for LMDS.”<sup>4</sup>

In prior phases of this proceeding, Nokia submitted ample analysis regarding a lack of evidence that terrestrial operations would cause harmful interference to FSS operations in the 28 GHz band. We devoted substantial engineering resources to run simulations and provide technical analysis for discussion of such coexistence, which were presented at a series of meetings. Results from these coexistence studies were also submitted to the Commission.<sup>5</sup> Among Nokia’s key conclusions was that it is not expected that aggregate interference from 28 GHz band terrestrial operations will cause harmful interference into satellite receivers (GSO and NGSO), and that limitations on terrestrial operations would not be required to mitigate against such interference.<sup>6</sup> After reviewing analyses submitted by “various parties, including satellite

---

<sup>4</sup> *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014 (2016), at ¶ 69 (“*First R&O*”).

<sup>5</sup> See, e.g., Letter from AT&T Services Inc., Nokia, Samsung Electronics America, T-Mobile USA, Inc., and Verizon (together, the “Joint Filers”) to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 14-177 *et al.* (filed May 6, 2016); See Letter from the Joint Filers to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 14-177 *et al.* (filed May 12, 2016); Letter from the Joint Filers to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 14-177 *et al.* (filed June 1, 2016) (“June 1 Joint Letter”).

<sup>6</sup> June 1 Joint Letter at 1.

operators,” the Commission determined in the *First R&O* in this proceeding that those studies “do not support establishment of an aggregate interference limit.”<sup>7</sup> The *First R&O* continues: “the risk of interference is very low.”<sup>8</sup>

Nokia recommends that the Commission hold to its precedent and decline to set limits to address aggregate interference. The International Bureau, the Office of Engineering and Technology, and the Wireless Telecommunications Bureau have jointly established a separate docket as a repository for any information parties wish to submit regarding this issue.<sup>9</sup> Nokia suggests that docket could also serve as the forum for any future concerns regarding aggregate interference in the 24 GHz band, should they arise.

## **II. NOKIA SUPPORTS OPERABILITY IN THE 24 GHZ BAND**

Nokia is pleased that the Commission has sought to promote greater operability of equipment, and proposes to extend that policy to the 24 GHz band.<sup>10</sup> Operability can facilitate manufacture of an equipment ecosystem available to a diversity of service providers, and efficient use of spectrum across the band. For the reasons addressed in the *Second FNPRM*, and consistent with the other bands addressed in this docket, Nokia supports the Commission’s operability proposal.

---

<sup>7</sup> *First R&O* at ¶ 67.

<sup>8</sup> *Id.*; See also *Second R&O*, *Second FNPRM*, *et al.*, at ¶¶ 147-149.

<sup>9</sup> See Docket Established for 28 GHz Aggregate Interference Analysis, 32 FCC Rcd 5022 (2017).

<sup>10</sup> *Second R&O*, *Second FNPRM*, *et al.*, at ¶ 108.

### **III. THE COMMISSION SHOULD QUICKLY ISSUE SERVICE RULES FOR LICENSED USE OF ADDITIONAL SPECTRUM ABOVE 24 GHZ**

#### **A. The Commission Should Promote Innovative Services in the 70/80 GHz Band and in bands 95 GHz and Above, as well as the 32 GHz, 37-37.6 GHz, 42 GHz, and 50 GHz Bands**

Nokia urges the Commission to continue strong momentum toward service rules for robust terrestrial broadband services in several bands that the Commission raised for consideration in earlier stages of this proceeding. We highlight the following spectrum ranges that have particular promise and warrant continued consideration:

**37.0-37.6 GHz:** The Commission already has issued service rules in the majority of the 37 GHz band for licensed terrestrial use, but reserved 600 MHz for shared use with Federal government services. The Commission should quickly develop and issue the service rules for 37-37.6 GHz. This is especially important since this uncertainty could impact the development of standards specifications and ecosystem pertaining to the remaining 37.6-40 GHz range, for which service rules are already issued.

**70/80 GHz:** The 71-76 GHz and 81-86 GHz band offer great opportunity for introduction of mobile services, with the large amounts of spectrum available, with the understanding that fixed microwave usage that already exists needs to be protected. Nokia has submitted substantial evidence to the Commission demonstrating that terrestrial mobile and fixed sharing is feasible. We are disappointed that the Commission tabled proposals for mobile services, citing other various, diverse proposals for the band already before the Commission that it will consider first. Nokia urges the Commission convene interested parties and create momentum toward resolution so that the existing docket does not become an indefinite gating item to mobile sharing in this valuable spectrum band.

**95 GHz and Above:** Nokia also supports the Commission's efforts to make additional spectrum available above 95 GHz for terrestrial fixed and mobile communications uses. To help lead the way for the next leap forward in wireless technologies and further push the spectrum frontiers, Nokia is joining with other technology leaders in founding the mmWave Coalition,<sup>11</sup> which supports the establishment of a regulatory framework in the U.S. to permit the use of radio frequencies above 95 GHz that will assist in bringing new applications to the market.

**32 GHz, 42 GHz and 50 GHz bands.** Nokia recommends that the Commission consider allocating and developing service rules 31.8-33.4 GHz ("32 GHz"), 42-42.5 GHz ("42 GHz"), and 50.4-52.6 GHz ("50 GHz") for flexible licensed terrestrial use, taking into account the study that T-Mobile filed with the Commission showing that 5G can readily coexist with Radio Astronomy Services ("RAS") and the Earth Exploration Satellite Service ("EESS") that are in the adjacent bands to these bands.<sup>12</sup>

**B. After Moving Forward with the Discrete Spectrum Ranges Already Under Consideration, the Commission Should Consider Opening the Whole 24.25 to 28.35 GHz Range for 5G**

With respect to bands not yet proposed by the Commission for comment in this proceeding, Nokia recommends that the Commission open the whole 24.25 to 28.35 GHz range for 5G, not just the 24.25-24.45 GHz, 24.75-25.25 GHz and 27.5-28.35 GHz portions of the

---

<sup>11</sup> See, Monica Allevan, *Nokia Leading Effort to Push for Spectrum Above 95 GHz*, FIERCE WIRELESS, Dec. 1, 2017, available at <https://www.fiercewireless.com/wireless/nokia-leading-effort-to-push-for-spectrum-above-95-ghz>; Home Page, mmWave Coalition, available at <http://mmwavecoalition.org/> (visited Jan. 22, 2018).

<sup>12</sup> See Letter from Steve B. Sharkey, Vice President, Government Affairs, Technology and Engineering Policy, T-Mobile USA, Inc., to Marlene Dortch, Secretary, Federal Communications Commission, IB Docket Nos. 15-256 and 97-95, WT Docket No. 10-112, filed Oct. 2, 2017.

range considered in this proceeding. Indeed, given the interest in 26.5-29.5 GHz in Korea, 24.25-27.5 GHz in Europe, 24.75-27.5 GHz in China and 27.5-29.5 GHz in Japan, this would allow the U.S. to leverage the ecosystem being developed globally and create around 4 GHz of contiguous spectrum for 5G that includes the 24 GHz, 26 GHz and 28 GHz bands. This action should not delay the auction and use of the 24 GHz and 28 GHz bands already identified and allocated by the Commission, and is a subsequent step for the future spectrum pipeline after successful regulatory action on those bands.

## **VIII. CONCLUSION**

For the foregoing reasons, Nokia requests that the Commission move forward as described in these Comments, including proceeding with expedited adoption of service rules and auction procedures for additional spectrum above 24 GHz.

Respectfully submitted,

**Nokia**

/Brian Hendricks/

Prakash Moorut  
Nokia Bell Labs & CTO

Brian Hendricks  
Jeffrey Marks  
Government Relations

Nokia  
1100 New York Avenue, NW  
Suite 705 West  
Washington, DC 20005

January 23, 2018